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NOTES ON CYPERACEAE OF ASSAM

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ABSTRACT

The paper includes, as addition to the Indian flora, *Carex eleusinoides* Turcz. *ex* Kunth, *Fimbristylis fimbristyloides* (F. v. Muell.) Druce and *F. yunnanensis* Clrake. Six species have been recorded as new to the Assam region. On examination of mature specimens, *Carex fuscifructus* Clarke has been proved to be a distinct species. Mistakes have been pointed out on the reported occurrence in India of *Carex lachenalii* Schkuhr, *C. prainii* Clarke and *Juncellus stylosus* Clarke. Doubts have been raised on the distinctivity of several taxa, and biosystematic studies have been suggested to solve some of the complexes. A list of twelve species and one variety endemic to the Assam region, and miscellaneous notes on some other taxa have also been included.

The following notes emerged during a revision of the family Cyperaceae in the Kanjilal Herbarium, Botanical Survey of India, Shillong, for the Assam region comprising the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. These include three new records for India, six new records for Assam region together with miscellaneous notes on fourteen other taxa. Nomenclatural problems have been discussed, though it has not been possible to give conclusive opinion on some of those where nomenclature has been tied up with taxonomy involving the interpretation of protologue and study of the *Type*, and outside Indian material. These have only been highlighted in the hope that the same would be taken up at places where the essential source data are available.

The specimens, unless mentioned otherwise, are all deposited in the Kanjilal Herbarium of the Botanical Survey of India, Shillong (ASSAM).

On the basis of the present knowledge, we may also list here the taxa of Cyperaceae that have turned out to be endemic to the Assam region. However, it may be indicated that the status accorded to them may become changed with further addition to the plant distribution data based on increased exploration in the hitherto scarcely explored adjoining areas of Bhutan, China, Burma and Bangladesh.

1. **Carex desponsa** Boott, Illustr. 2 : 82. t. 228. 1860.
2. **C. distracta** Clarke in Hook. *f.* Fl. Brit. Ind. 6 : 715. 1894.
3. **C. ecostata** Clarke in Hook. *f.* Fl. Brit. Ind. 6 : 720. 1894.
4. **C. fuscifructus** Clarke in Hook. *f.* Fl. Brit. Ind. 6 : 742. 1894.
5. **C. munipoorensis** Clarke in Hook. *f.* Fl Brit. Ind. 6 : 729. 1894.
6. **C. parvigluma** Clarke in Hook. *f.* Fl. Brit. Ind. 6 : 716. 1894.
7. **C. repanda** Clarke in Hook. *f.* Fl. Brit. Ind. 6 : 720. 1894.
8. **C. rubrobrunnea** Clarke in Hook. *f.* Fl. Brit. Ind. 6 : 710. 1894.
9. **C. spiculata** Boott in Proc. Linn. Soc. 1 : 288. 1845.
10. **C. scitula** Boott, Illustr. 4 : 177. t. 600. 1867.

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11. **Fimbristylis carpopoda** Govindarajalu in Proc. Ind. Acad. Sci. 79 : 160. 1974.

12. **F. circumciliata** Govindarajalu in Proc. Ind. Acad. Sci. 79 : 163. 1974.

13. **Scleria bracteata** var. **assamica** Clarke in Hook. *f.* Fl. Brit. Ind. 6 : 694. 1894.

Carex daltonii Boott, Illustr. 1: 15. t. 16.1859.

New to Assam; earlier known from the adjoining areas of Sikkim and Bhutan.

ARUNACHAL PRADESH: Kameng, *s.l., R. S. Rao* 1243.

Carex eleusinoides Turcz. *ex* Kunth, Enum. Pl. 2: 407.1837; Boott, Illustr. 4: 132. t. 428. f. 1. 1867; Kükenth. in Engl. Pflanzenr. 4(20). Heft 38: 299. 1909.

The species was so far known only from U.S.S.R. and China. However, during the course of the revision in ASSAM herbarium, three specimens of *Carex* collected by Kingdon-Ward, earlier identified to *Carex obscura* Nees/*Carex sp. nov.*, were conclusively found to be *C. eleusinoides* Turcz. *ex* Kunth. Further study in the Central National Herbarium, Calcutta revealed the presence of three more specimens collected in Sikkim in 1878, thus, widening the distribution of *Carex eleusinoides* from U.S.S.R. & China to Eastern Himalayas. A detailed description and illustration is provided here, since the same is not available in any of the Indian Floras.

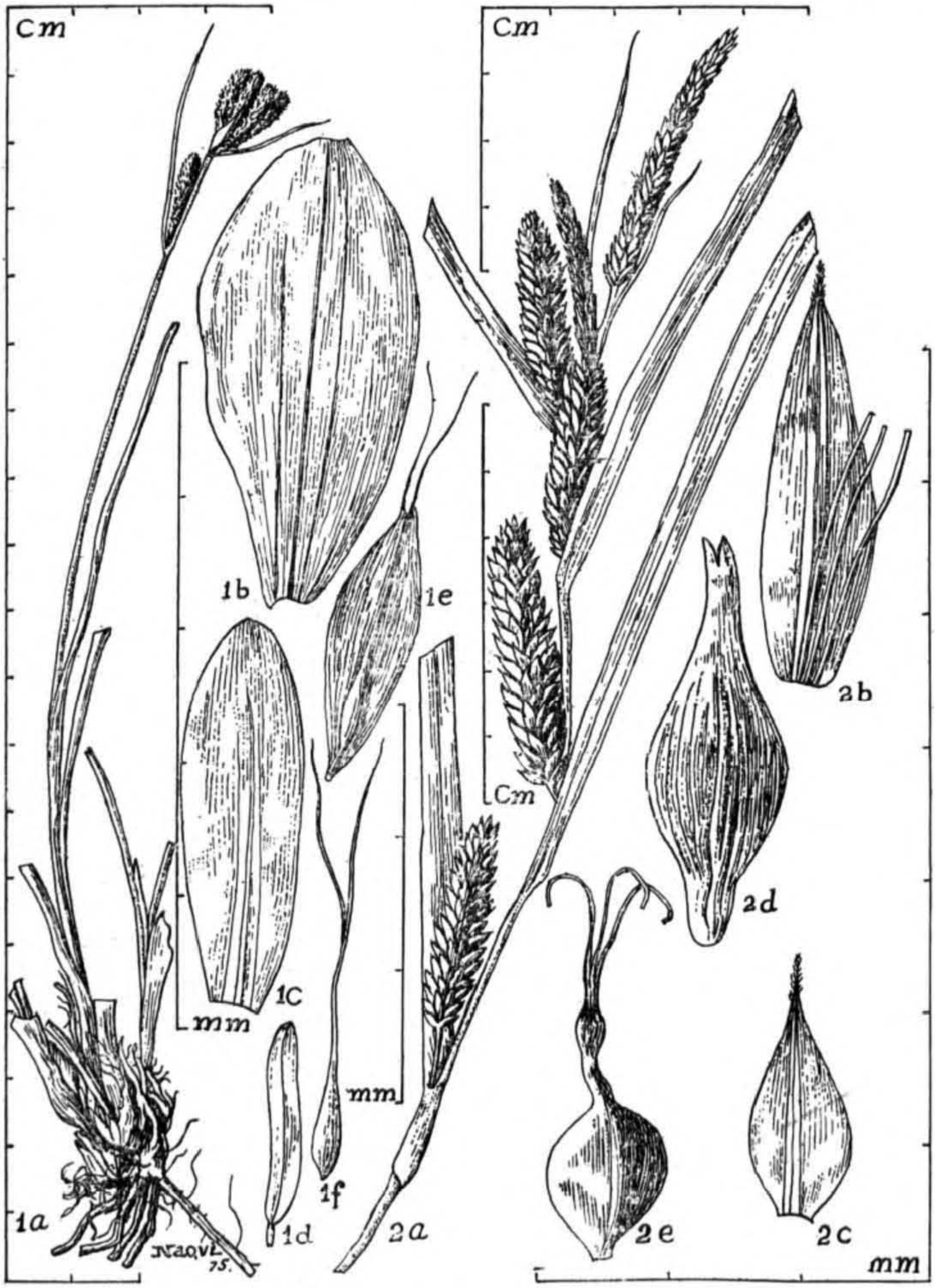
Perennial tufted herbs, 15-28 cm high. *Rhizomes* short, creeping. *Stems* slender, suberect, compressed-trigonous, scaberulous above on the angles, *ca* 1 mm thick. *Leaves* mainly clustered at the base, subequalling the stem, 1.5-2.0 mm broad, acute, margins scabrid; sheaths castaneous, ultimately fibrous. Bracts lower 1-2 foliaceous, subequalling or slightly exceeding the inflorescence, not or shortly sheathing, the upper cetaceous. *Spikelets* 4 - 6, suberect, congested at the tip, cylindric, 1 - 2 cm long, 2 - 4 mm thick, all sessile or the lower shortly peduncled; terminal spikelet female at the top, male at the base, lateral spikelets wholly female; male glumes oblong, obtuse, 3.5 - 3.8 x 1.5 - 1.8 mm, deep purple or castaneous, narrowly hyaline-margined, with three green nerves reaching about half way up the glume; female glumes elliptic-oblong, obtuse, 2.5 - 3.0 x 0.8 - 1.0 mm, deep purple or castaneous, narrowly hyaline-margined, with three green nerves ending just below the tip. *Stamens* 3; anthers 1.0-1.5 mm long, obtuse. *Style ca* 1 mm long; stigmas 2, *ca* 1.5 mm long. *Utricles* shortly stipitate, compressed or plano-convex, membranaceous, ovate-oblong, 2.0 - 2.5 mm long, faintly nerved, greenish stramineus to purple tinged; beak short, entire, with a concave mouth. *Nuts* (mature ones not seen) ovate-oblong, punctate (Fig. 1 a - f).

ARUNACHAL PRADESH: Lohit: Walong-Rima, *Kingdom-Ward* 19627 (ASSAM). SIKKIM: Na Teng, *Deuybor s.n.* (CAL *acc. nos.* 514167, -8 & -9.

Carex fuscifructus Clarke in Hook. *f.* Fl. Brit. Ind. 6: 742. 1894.

This species originally described by Clarke from young plants with immature utricles and nuts was subsequently considered by Kükenthal [in Engl., Pflanzenr. 4(20), *Heft* 38: 754. 1909] to be doubtfully synonymous to *Carex aristata* R. Br. subsp. *orthostachys* (C. A. Mey.) Kükenth. However, on examination of the mature plants, *Mann* 95, *C. fuscifructus* with its characteristically beaked nuts, has proved to be a very distinct species. Hence, in view of the above, a detailed description (with illustration) is provided below. Incidentally, this particular collection in ASSAM herbarium was identified by Clarke as *C. desponsa* Boott, while a duplicate of the same in Calcutta herbarium first kept under *C. wallichiana* Presc. *ex* Nees was corrected, in 1901, by Clarke himself, to *C. fuscifructus* Clarke!

Perennial herbs, 4-6 dm high. *Stems* stout, erect, trigonous, smooth, *ca* 3 mm thick. *Leaves* clustered at the base, much exceeding the stem, 5-8 mm broad, acuminate, margins and costae above scabrid. *Inflores-*



Figs. 1-2 : 1. *Carex eleusinoides* Turcz. ex Kunth : a. Habit. b. Male glume. c. Female glume. d. Stamen. e. Utricle. f. Pistil. 2. *Carex fuscifructus* Clarke : a. Inflorescence. b. Male glume with filaments. c. Female glume. d. Utricle. e. Nut with style.

cence racemose, 20-25 cm long; lower bracts foliaceous, much exceeding the stem, sheathing, lowest 30-45 cm long; spikelets 3-8, cylindric; lower distant on 5-13 cm long exerted peduncles; upper approximate, subsessile; upper 2-3 spikelets male, the rest female; terminal 3.5-4.5 cm long, *ca* 3 mm thick; other males 1.0-2.5 cm long; females 3.5-5.5 cm long, 7-10 mm thick; male glumes oblong, lanceolate, mucronulate, 5.5-6.3 mm long, hispidulous at the tip, stramineus; female glumes ovate-oblong, lower awned, upper mucronulate, excluding the awns, 3.3-3.7 mm long, stramineus; awns up to 2 mm long, hispidulous. *Stamens* 3. *Style ca* 1 mm long, persistent; stigma 3, *ca* 2.2 mm long. *Utricles* stipitate, ultimately divaricate, herbaceous, somewhat inflated, ovoid, trigonous, 5-6 mm long, 2.0-2.5 mm broad, subabruptly beaked, prominently several-nerved, greenish fuscus; beak 1.8-2.0 mm long, bidentate, glabrous or hispidulous. *Nuts* shortly stipiate, obovoid, long-beaked, stramineus; main body *ca* 2.3 mm long, *ca* 1.7 mm broad; beak *ca* 1.5 mm long with a conspicuous nodular swelling at the tip continued into the style. (Fig. 2 a-e).

ASSAM: Lakhimpur: Makum, *Clarke* 37814 (*T. n.v.*). Lower Assam, *s.l.*, *Mann* 95 (ASSAM & CAL).

Carex hebecarpa C. A. Mey. var. **lachnosperma** Clarke in Hook. *f.* Fl. Brit. Ind. 6: 747. 1894. *C. hebecarpa* var. *maubertiana* Franch. in Nuv. Arch. Mus. Paris, ser. 3. 10: 70. 1898; Kükenth. in Engl. Pflanzenr. 4(20), *Heft* 38: 745. 1909.

Under Articles 60 and 72 of the Leningrad Code (1978), *C. hebecarpa* var. *lachnosperma* Clarke would appear to be correct name at the varietal level and not *C. hemecarpa* var. *maubertiana* (Boott) Franch. as adopted by Kükenth. (*l.c.*) who cited *C. hebecarpa* var. *lachnosperma* Clarke (*non C. lachnosperma* Nees, 1834), and *C. maubertiana* Boott (Illustr. 1: 45. t. 114. 1858) as its synonyms.

Nelmes (in Reinwardtia 1: 408. 1951) considered *C. maubertiana* Boot, as a distinct species and cited *C. hebecarpa* var. *maubertiana* Franch. (*l.c.*), Kükenth. (*l.c.*) as its only synonym without making any reference to the Indian material described by Clarke under var. *lachnosperma*; similarly Backer (in Fl. Java 3: 489. 1968) also considered *C. maubertiana* Boott as a distinct species and cited *C. hebecarpa* var. *ligulata* Auct. as its synonym. However, keeping in view Clarke's remarks while he described var. *lachnosperma*, based on Indian material, including therein *C. lachnosperma* Nees, and *C. maubertiana* Boott, as it's synonyms "appears exactly intermediate between *C. ligulata* Nees and *C. hebecarpa* C. A. Mey.", the identity of the Khasi hill material (*Hook. f.* 1830 & *Griffith* Kew no. 6063) which we have not seen, and the status of all the above mentioned specific and varietal names need revaluation with reference to protologue and the whole of the Indian and south-east Asian material.

Carex inanis Kunth, Enum. Pl. 2: 522. 1837.

It is a high altitude species earlier known from the western Himalayas and Sikkim, between 2300-4000 m and its present record from an altitude of *ca* 2500 m is a further eastward extension of its known distribution.

ARUNACHAL PRADESH: Kameng: Zang-Towang, R. S. Rao, 7854. Lohit, *s.l. Kingdon-ward* 19175.

Carex lachenalii Schkuhr, Reidgr. 1: 51. t. Y. f. 79. 1801; Ohwi, Fl. Jap. 228. 1965. *C. lagopina* Wahlenb. in Vet. Akad. Handl. Stockholm 24: 145. 1803; Kükenth. in Engl. Pflanzenr. 4(20), *Heft* 38: 213. f. 35A-B. 1909. *C. cooptanda* Clarke in Hook. f. Fl. Brit. Ind. 6: 707. 1894 *et* in J. Linn. Soc. Bot. 34: 110. 1898.

The species is so far known, apart from the Assam region, only from the alpine zones of Europe, north Ameirca and Japan. Clarke (*l.c.* 1894) while describing it as *C. cooptanda* states "there are three excellent specimens, exactly like each other, and very unlike any other Indian *Carex*, with a note of Boott on them in Herb. Hook. stating that they were collected by Griffith in Assam," and further (*l.c.* 1898) 'Khasia, Griffith. Three pieces, one collection, laid in Herb. Kew, with note by Boott.' While we have not seen these specimens there appears to be a possibility of these being wrongly localised, particularly since this species does not appear to have been collected again anywhere, or even in the neighbourhood of the Indian sub-continent. Further, none of the other *Carex* species from the Assam region are known to occur in the alpine zones of Europe and north America, though some are found in Japan. Hence, it is suggested that this name should be deleted from the list of Indian flora unless fresh collections are made.

Carex prainii Clarke in J. Linn. Soc. Bot. 36: 305. 1904; Kükenth. in Engl. Pflanzenr. 4(20), *Heft* 38: 548. 1909.

Clarke described this species from China on 'Yunnan: Fengcheulin, 9500 feet, *Henry* 10839', but under its distribution he also gives 'Naga Hills of N. E. India'. Following Clarke, Kükenthal (*l.c.*) also cites *Henry* 10839 and puts a (?) mark before giving its distribution in Naga hills. This created doubts as to its occurrence in India. Since the specific epithet was based on Prain, we searched for Prain's collections from Nagaland and found three sheets of *Prain* 50, collected in Nagaland at Pulinaladza, alt. 7700 ft. on 23rd April, 1886 with a determinavit slip *'Carex Prainii* sp. nov.' signed by Clarke on 12th & 17th April, 1901, deposited in the Calcutta herbarim. The Type of *Carex prainii, Henry* 10839, has also been found in the Calcutta herbarium with a note by Clarke on 23rd April, 1901 *'Carex* sp. I had this *Henry* n. 10839 as a species next to *C. decora* Boott. I believe it is the same plant as *Prain* n. 50 from upper Assam which I have made in manuscript a new species *Carex Prainii.* But I have no specimen (and no full description) of *C. prainii* here to compare.' It is obvious from the above note that while describing *C. prainii* on *Henry* 10839, *Clarke* did not have *Prain* 50 with him, and hence did not use it in his description, but presumably from memory he gave its distribution to Nagaland also. However, a study of the sheets has revealed that *Prain* 50 with a short rootstock, deep brown-blackish shining leaf-sheaths, 4-6 mm broad leaves and long-awned female glumes is certainly distinct from *Henry* 10839 which has a creeping rhizome, dull pale brown leaf-sheaths, 10-12 mm broad leaves and acute female glumes. Thus, the reported occurrence of *Carex prainii* Clarke from Nagaland is wrong. *Prain* 50 may represent a new species belonging to *Carex* sect. *Decorae* (Kükenth.) Ohwi, and needs further study.

Carex royleana Nees in Wight, Contr. Bot. Ind. 127. 1834.

Clarke (in Hook. f. Fl. Brit. Ind. 6: 746. 1894) considered *C. royleana* Nees to be conspecific with *C. breviculmis* R. Br. but Kükenthal [in Engl. Pflanzenr. 4(20), *Heft* 38: 469. 1909] considered it to be a distinct subsp. of *C. breviculmis.* In a more recent treatment Nelmes (in Reinwardtia 1: 373-74. 1951) described *C. breviculmis* known from S. E. Asia, Japan and Australia, as having the leaves mostly much longer than the stem, 1-4 mm broad and utricles less hairy and more strongly nerved than the Indian *C. royleana.* In the Assam gatherings examined by us, the leaves are 1.5-2.3 mm broad and though mostly shorter than the stem, at least in one collection, *G. K. Deka* 33114, the leaves are distinctly equalling to exceeding the stem by upto 5 cm. The comparative distinction of the hairiness and nervation of the utricles can only be evaluated and commented upon after examination of the extra-Indian material. Fischer (in Gamble, Fl. Pres. Mad. repr. ed. 3: 1166) who was more likely to have handled plants allied to *C. royleana* which was originally described from the Indian Peninsula, also described *C.*

breviculmis as having leaves longer than the stem but narrow, upto 2 mm broad. Thus, it appears that atleast the leaf length is much variable and more work is needed to conclusively unite or segregate *C. royleana* Nees, and *C. breviculmis* R. Br., and until then we have preferred to follow Nelmes (*l.c.*) in treating the following Assam plants as *C. royleana* Nees.

ARUNACHAL PRADESH: Kameng: Rupa-Bomdila, *Panigrahi* 6826. Shergaon-Jigacn, *Panigrahi* 15930. MEGHALAYA: K. & J. Hills: Markasa, *G. V. S. Rao* 28378. Shillong, G K. *Deka* 31770; 33114; *Verma* 34190.

Cyperus subgen. **Cyperus** pars **Pycnostachys** *et* **Choristachys** Kükenth., *et* subgen. **Pycreus** pars **Isodiametrici** *et* **Zonati** Kükenth.

Consequent upon the treatment of the genus *Cyperus* L., *Mariscus* Vahl, *Pycreus* P. Beauv., *Juncellus* Clarke, *Kyllinga* Rottb. and others as only subgenera of a single genus *Cyperus*, Kükenthal [in Engl. Pflanzenr. 4(20), *Heft* 101: 42. 1935] probably faced the problems of terminology in respect of categories which Clarke (in Hook. f. Fl. Brit. Ind. 6: 589-619. 1893, while treating all the above as distinct genera) had described as subgenera of *Cyperus* and subgenera of *Pycreus*, and uesd the term 'Pars' for these categories, and included under these Sections, Subsections and Series. While in the subgenus *Pycreus* the species may be readily assigned to *Isodiametrici* (with superficial cells of the nuts subquadrate hexagonal, making the surface of the nuts reticulate) or *Zonati* (with superficial cells of the nuts longitudinally obolng, making the surface of the nuts transversely zonate), in the subgenus *Cyperus*, the differences between *Pycnostachys* (with digitate or clustered spikelets) and *Choristachys* (with spicate, sometimes very shortly, spikelets) is less clear and there are several species like *Cyperus compressus* L., *C. macer* Clarke, *C. pangorei* Rottb. and others, exhibiting intermediate arrangement of the spikelets, and cannot be satisfactorily placed in either of the two arms. Further, under the current usage of categories, as laid down in the International Code, a category like 'Pars' is out of place, and its use should be avoided.

Cyperus cyperoides (L.) O. Ktze. Rev. Gen. Pl. III. 2: 333. 1898, Kern in Fl. Males. ser. I.7: 642-43. 1974. *Scirpus cyperoides* L. Mant. 2: 181. 1771. *Mariscus sieberianus* Nees, in Linnaea 9: 286. 1834, *nomen nud.*; Clarke in Hook. f. Fl. Brit. Ind. 6: 622. 1893. *M. cypercides* Urb. in Symb. Antill. II. 1: 164. 1900.

The taxonomy of *C. cyperoides* is quite confusing. Clarke (in J. Linn. Soc. Bot. 34: 45. 1898) remarked under *Mariscus hookerianus* "It must be understood that the species of *Mariscus* (1-8 foregoing, including *M. sieberianus*) are very closely allied; probably Mr. Bentham would have called them all *Cyperus umbellatus*". Subsequently also (in Thiselt.-Dyer, Fl. Trop. Afr. 8: 389. 1902) he stated "the eleven following species (upto *M. flavus*), being in the opinion of competent botanists, only forms of *M. sieberianus* are described shortly as to the chief points wherein they differ from *M. sieberianus*". Even while describing *M. sieberianus* var. *khasiana* (in Hook. f. *l.c.*) he has left a (?) mark, mentioning therein two collections—Shillong, *Clarke* and East Bengal, *Griffith*, though again later (in J. Linn. Soc. Bot. 34: 45. 1898) he cited only part of Griffith's collection (Kew No. 6244 *p.p.*) under this variety stating it to be endemic to East Bengal, and has made no reference to his own Khasi hill collection from Shillong.

With this background our own study of several populations in an effort to attempt a classification has led us to the conclusion that the range of variation in the characters used historically are contiguous and do not provide any sharp distinctions. Thus, a study in relation to stature and robustness of plants, as well as the breadth of the leaves revealed that no taxonomic significance can be assigned to these vegetative characters. Similarly, in relation to the number of nuts per spikelet also, there is a variation of 1 - 4 nuts, even in the same plant, as against the usual 2. With these observations and Clarke's feelings of uncertainty we do not feel that Clarke's two varieties, *M. sieberianus* var. *evolutior* and var. *khasianus* would prove distinct. Kern (*l.c.*) has also expressed his doubts on the distinctiveness of some of its earlier describe sdubspecific taxa. Obviously, a bio-systematic approach is needed to solve this complex.

Also, in *Verma* 37801, it was noticed that there is an abnormal tendency towards compound nature of the umbel which is otherwise always simple.

ARUNACHAL PRADESH: Kameng: Bhairabkunda, *Panigrahi* 15119. Brukpalanchen-Warang, *Panigrahi* 15672. Rupa-Dedze, *Joseph* 40482. Tawang-Zang, *R. S. Rao* 7973. Lohit: Glow, *Joseph* 48572. Siang: Pasighat, *G. K. Deka* 15930. Subansiri: Palin-Sayata, *G. V. S. Rao* 24863. Tirap: Chenglang-Khela, *Panigrahi* 14432. Laju-Raho, *Panigrahi* 14725. Naglo, *Deb* 26302. ASSAM: Darrang: Nunai beat-house, *Nath* 13923. Goalpara, *Paul* 13032. Kamrup: Gauhati-Jorhat. *Panigrahi* 9265. Lakhimpur: Kakoi, *Verma* 46224. Sadiya, *Anon* 12710. Sibsagar: Motharguri, *R. S. Rao* 9925, 9942. Assam, *Mann* 278. MEGHALAYA: Garo hills: Tura, *Bor* 21324. K. & J. Hills: Dawki, *Verma* 37850. Garampani, *Verma* 37868. Nongpoh, *G. K. Deka* 21598. Reliang, *R. S. Rao* 2611. Shillong, *Chowdhury* 25109; *G. K. Deka* 21450, 23336, 31767, 35975; *Panigrahi* 2885; *Sharma* 10114; *Verma* 35631, 35641, 37801, 37810. Umjasiaw, *Verma* 37885. Umsaw, *Sharma* 12083. Khasi hills, *Mann* 825, 1160.

Cyperus digitatus Roxb. var. **hookeri** (Boeck.) Clarke in Hook. f. Fl. Brit. Ind. 6: 618. 1895; Kükenthal in Engl. Pflanzenr. 4(20), *Heft* 101: 56. 1935. *C. hookeri* Boeck. in Linnaea 36: 308. 1870. *C. auricomus* var. *khasiana* Clarke in J. Linn. Soc. Bot. 21: 188. 1884.

If we take the above synonymy given by Clarke (*l.c.*) and Kükenthal (*l.c.*) to be based on sound taxonomic judgement, *C. digitatus* Roxb. var. *khasiana*, based on *C. auricomus* var. *khasiana* Clarke (*l.c.*) would be the correct name. However, a study of the Types of the concerned taxa and the range of variation within *C. digitatus* Roxb. is desirable before making any new combination.

Cyperus latespicatcs Boeck. var. **acaulis** Clarke in J. Linn. Soc. Bot. 21: 41. 1884; Kükenth. *l.c.* 393. *Pycreus latespicatus* Clarke, Illustr. Cyper. p.p. t. 3. f. 5. 1909.

It is known only from the solitary collection of *Clarke* 15165 (T.) from Cherrapunji, K. & J. Hills and distinguished by '*Stems* amlost absent. *Inflorescence* sessile; rays 1 - 4, lateral, 1 - 7 cm long.' However, the Type, *Clarke* 15165 is illustrated by Clarke himself (*l.c.*) under *Pycreus latespicatus* Clarke (=*Cyperus latespicatus* Boeck.). Further, he has made no mention of var. *acaulis* in his later treatments (in Hook. f. *l.c.* and J. Linn. Soc. Bot. vol. 34. 1898). In view of the above and also of the fact that in *C. latespicatus* the stems vary from 6-40 cm in height, rays are 1 - 4, the longest 2 - 7 cm long, it is possible that var. *acaulis* was described only on a depauperated specimen. However, it is to be confirmed only with more collections from its Type locality.

Currently *C. latespicatus* Boek. itself has been treated as a synonym of an earlier name *C. diaphanus* Schrad. which in turn has been retransferred to *Pycreus* [Koyama in Journ. Jap. Bot. 5(10): 316. 1976].

Cyperus leucocephalus Retz. Observ. 5: 11. 1789; Clarke in Hook. f. Fl. Brit. Ind. 6: 602. 1893, *et* in J. Linn. Soc. Bot. 34: 24. 1898: Kükenth *l.c.* 278.

With reference to the distribution of this species in the Assam region Clarke (*l.c.*

1898) gives: Chundragona (in Chittagong?), *Koenig* (incidentally, Chandrakona is about 112 km. west of Calcutta, in Midnapore district, West Bengal) and Kükenth. (*l.c.*) simply gives Assam, without giving any exact locality or collector's name. Hence, its occurrence in the Assam region is very doutbful. Moreover, Kern (in Reinwardtia 3: 39. 1954 *et* in Fl. Males. Ser. I. 7: 632. 1974) has convincingly shown that Clarke's and Kükenthal's circumscription of *C. leucocephalus* Retz. was wrong in including within it another distinct species, *C. pulchellus* R. Br. (in Prodr. 213. 1810). Thus, even if there is a collection from the Assam region under *C. leucocephalus,* which we have not seen, it needs to be further verified whether it belongs to *C. leucocephalus* Retz. or *C. pulchellus* R. Br.

Fimbristylis cinnamometorum (Vahl) Kunth, Enum. Pl. 2: 229. 1837; Hook. f. in Trimen, Handb. Fl. Ceylon 5: 61. 1900; Kern in Fl. Males. ser. I. 7: 565. 1974. *Scirpus cinnamometorum* Vahl, Enum. Pl. 2: 278. 1806. *F. cyperoides* R. Br. Prodr. 228. 1810; Clarke in Hook. f. Fl. Brit. Ind. 6: 650. 1893. *F. cyperoides* var. *cinnamometorum* (Vahl) Clarke, *l.c.*

New to Assam; earlier known from South India (Andhra Pradesh, Karnataka, Kerala and Tamilnadu), Australia, S. E. Asia, Burma, Ceylon and China (Figs. 3 a-e).

MEGHALAYA: K. & J. Hills: Garampani, *Verma* 37869 (ASSAM); Khasi hills, *Mann* 932 (ASSAM & CAL).

Fimbristylis fimbristyloides (F. v. Muell.) Druce in Rep. Bot. Exch. Cl. Brit. Isl. 1916: 623. 1917: Kern in Fl. Males. ser. I. 7: 569. 1974. *Abildgaardia fimbristyloides* F. v. Muell. Fragm. Phyt. Austral. 8: 273. 1874.

Its collection from the Khasi hills constitutes a new record from India. Earlier this species was known from some scattered collections from China, S. E. Asia and Australia. A description and illustration is being provided here to facilitate its identification.

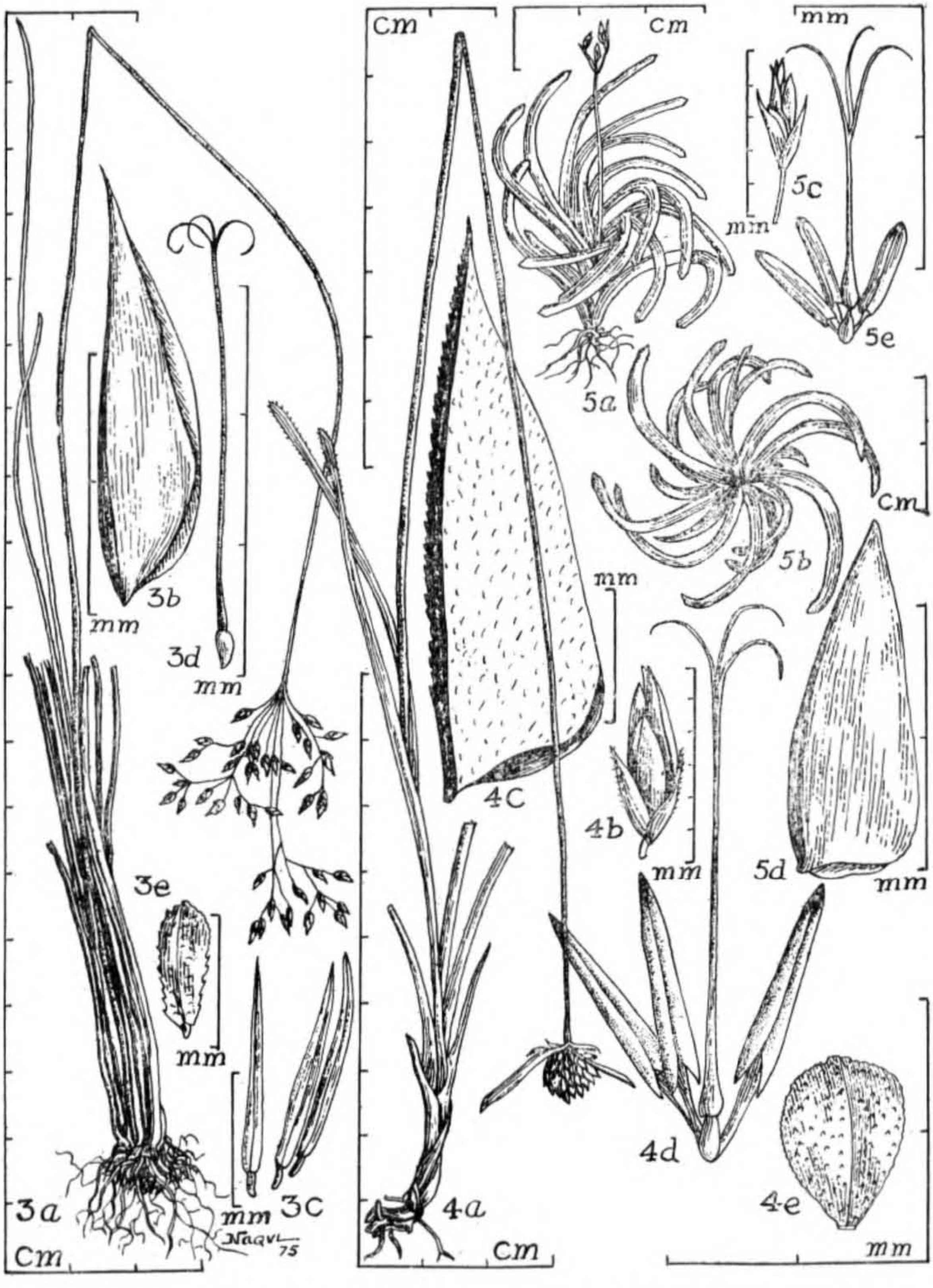
Annual herbs, 2-6 cm high. *Roots* 1-2 cm long. *Stems* slender, triquetrous, 0.3-0.5 mm thick, smooth. *Leaves* numerous in a basal rosette, all strongly curved either clockwise or anti-clockwise, flat, 3-7 cm long, *ca* 2 mm broad, abruptly acute to a triangular tip. *Anthela* simple or compound, 1-3 cm long, bearing 3-7 spikelets; bracts 2-4, foliaceous, lowest 8-13 mm long; rays 2-5, suberect; spikelets solitary, lanceolate, compressed, 3-5 × 1.5-2.0 mm, deep brown or ultimately blackish; glumes subdistichous, ovate-lanceolate, 2.5-3.0 mm long, acute or mucronulate, hairy. *Stamens* 2-3; anthers linear-oblong, 0.5-0.7 mm long. *Nuts* shortly stipitate, obovoid, abruptly truncate at the base, *ca* 0.7 × 0.5 mm, smooth or verruculose, surface cells hexagonal (Figs. 5 a-e).

Colonising denundated stream-bed, in rock-crevices; at about 700 m.

MEGHALAYA: K. & J. Hills: Ioksi, near Garampani, *Verma* 37874.

Fimbristylis hookeriana Boeck. in Linnaea 37: 22. 1877; Kern in Blumea Suppl. 4: 165. 1958.

During our study of the populations of this species in the Jaintia hills the species showed polymorphism to the extent that some of the smaller gatherings, particularly in herbaria, may appear to represent distinct new taxon. While Kern (*l.c.*) has recorded some variations, a few more important variations are being recorded here. Thus, the stems, usually 5-25 cm high, are sometimes up to 45 cm high; leaves usually 5-20 cm long, are sometimes up to 45 cm; anthela rays usually 3-5, are sometimes up to 9 in number and these usually 2.5-9 cm long are sometimes up to 17 cm long; lowest bract, usually 3-12 cm long, are sometimes up to 35 cm long; spikelets, usually in clusters of 2-6 with a few solitary ones, are sometimes all solitary, on up to 10 cm long pedicels with only a few, sometimes, in pairs, giving the plants a very



Figs. 3-5 : 3. *Fimbristylis cinnamometorum* (Vahl) Kunth : a. Habit. b. Glume. c. Stamens. d. Pistil. e. Nut. 4. *F. yunnanensis* Clarke : a. Habit. b. Spikelet. c. Glume. d. Flower. e. Nut. 5. ***F. fimbristyloides*** (F. v. Muell.) Druce : a & b. Habit. c. Spikelet. d. Glume. e. Flower.

different appearance; glumes, usually 3.5-4.0 mm long are sometimes up to 5 mm long.

Meghalaya: K. & J. Hills: Bholagunj, *G. K. Deka* 15939. Cherrapunji, *G. K. Deka* 22247; *Panigrahi* 3495. Jorain-Muktapur, *Verma* 37827. Mowsmai, *G. K. Deka* 19046. Pontung, *Sharma* 21349. Syndai-Muktapur, *Verma* 37831.

Fimbristylis pierotii Miq. in Ann. Mus. Lugd. Bat. 2: 145. 1865.

New to Assam; earlier known from Western Himalayas, Japan and S. E. Asia.

Assam: *s.l.*, *Mann* 279AA (ASSAM). Meghalaya: Khasia, 5000 ft., *Mann* 279 (CAL).

Fimbristylis sleumeri Kern in Blumea 15: 437. 1968.

A solitary collection in January, 1969, from Khasi hills, *Verma* 34175, with short, 1-2 mm broad, more or less curved, rosulate, 7-9-nerved leaves lacking a distinct midrib, simple or compound anthela with glabrous rays, distichous muticous glumes slightly hairy at the tip, trifid glabrous style with a broad base and shortly stipitate, obovoid, trigonous, 0.7-1.1 × 0.6-0.7 mm, tuberculate nuts, comes very near to *F. sleumeri* Kern. However, while in *Verma* 34175, the glumes are 3.7-5.0 mm long and styles 3.5-4.0 mm long, in *F. sleumeri* Kern the glumes are described as 2.5-3.0 mm long and styles 2.0-2.3 mm long, and these quantitative differences leave a doubt about the identity of the Khasi hill plants to *F. sleumeri* Kern, from N.-E. Thailand. An earlier collection in Calcutta herbarium, *Lace* 5964, collected in Sept., 1912 from Maymyo plateau, Burma, about which Kern (*l.c.*) says that it may belong to *F. sleumeri* is also very near to the Khasi hills plant referred to above. Further collections from the Khasi hills, Burma and Thailand are needed to confirm whether *F. sleumeri* Kern, is a variable species distributed from Thailand to Khasi hills through Burma.

Meghalaya: K. & J. Hills: Ummulong, 1000 m, *Verma* 34175 (ASSAM). Burma: Maymyo plateau, *Lace* 5984 (CAL).

Fimbristylis stolonifera Clarke, var. **ludens** Clarke in Hook. f. Fl. Brit. Ind. 6: 637. 1893.

It has been distinguished by Clarke (*l.c.*) on 'Style branches 3 or 4'. However, in var. *stolonifera* itself we have noticed that though the styles are almost always bifid, there is a tendency towards trifid styles with one of the style-branches sometimes being partly or fully bifurcated; the report of 4 style-branches, not found anywhere in the normal flower of Cyperaceae, may also be a similar abnormal variation and needs further checking. It is so far known only from a solitary collection of *Clarke* 43292 from the Khasi hills which we have not been able to examine.

Fimbristylis tristachya R. Br. Prodr. 226. 1810; Kern in Blumea 8: 131. 1955 *et* in Fl. Males. ser. I. 7: 573. 1974. *non* Thw. 1864, *nec.* Clarke in Hook. f. Fl. Brit. Ind. 6: 649. 1893.-*F. schoenoides*; Clarke *l.c.* 634 *p.p.*

Clarke (*l.c.*) had confused it with *F. schoenoides* (Retz.) Vahl, from which it can be distinguished by several quantitative characters (*cf.* Kern, *l.c.*). While rechecking the identity of the material deposited under *F. schoenoides* it was found that *F. tristachya* R. Br. is also well distributed in Khasi and Jaintia Hills. Incidentally, it may also be mentioned that Clarke (*l.c.*, 649) had wrongly adopted the name *F. tristachya* Thw., a later homonym, for another distinct species for which the correct name is *F. triflora* (L.) Schum. *ex* Engl.

Meghalaya: K. & J. Hills: Cherrapunji, *Bor s. n.* (*acc. nos.* 31501, 31505); *G. K. Deka* 19202, 22269, *s. n.* (*acc. no.* 39846). Jorain-Jowai, *Balakrishnan* 42770. Jowai, *G. K. Deka* 12362; *Verma* 37813. Mawmloo, *P. C. Kanjilal* 10402. Shillong, *Verma* 34163.

Fimbristylis yunnanensis Clarke in J. Linn. Soc. Bot. 36: 247. 1903; Kern in Blumea 10: 648. f. 3 J-S. 1960 *et* in Fl. Males. ser. I. 7: 591. 1974.

A rare collection of this species by Bor in Nagaland was lying unreported in the ASSAM herbarium. So far it is known only from its Type collection in China and two doubtful collections from north Thailand, and constitutes a new record for India. It is easily recognised by its leafy stem terminated by a globose head of compressed spikelets with subdistichous glumes. A detailed description is provided below.

Perennial herbs, *ca* 3.5 (-8.0) dm high. *Rhizome* short, woody; scales ovate, striate, ferrugineous. *Stems* slender, *ca* 0.7 mm thick, 4-5-striate, sparsely hairy. *Leaves* canaliculate at the base, one-third to half as long as the stem, 1-2 mm broad, acute, sparsely hairy, eligulate; sheaths castaneous, densely hairy. *Inflorescence* a solitary, terminal, globose head, *ca* 12 mm across, bearing many spikelets; bracts foliaceous, widely spreading to deflexed, hairy, lowest *ca* 2 cm long; spikelets lanceolate, compressed, 5-8 × 1.5-2.0 mm, brown, acute, 3-7-flowered; rhachilla broadly brown-winged, caducous; glumes subdistichous, ovate-lanceolate, keeled, 4.2-5.5 mm long, pubescent, acute or mucronulate; lower 3 empty, shorter, aristate; uppermost sterile; keel green, 1-nerved, usually scabrid. *Stamens* 3; anthers linear-lanceolate, 1.5-3.0 mm long, crest subulate; style slender, 3-4 mm long, glabrous; stigmas 3, ca 1 mm long. *Nuts* minutely stipitate, obovoid, very obtusely trigonous, *ca* 1.3 × 1.0 mm, densely verrucose, whitish stramineus; apex somewhat umbonulate; surface cells isodiametric. (Fig. 4 a-e).

NAGALAND: *s.l.*, *Bor* 6383.

Juncellus stylosus Clarke in Hook. f. Fl. Brit. Ind. 6: 595. 1893.

After describing this species Clarke himself, while listing his material on which his account of Cyperaceae (*l.c.*) was based stated (in J. Linn. Soc. Bot. 34: 18. 1898) "To be wiped out! The single sheet on which the species is founded is *Pycreus umbrosus* Nees (a South African Plant), it is marked in herb. Kew 'Khasya Hills, *Griffith*'. I have no doubt that this locality is some herbarium error that was introduced at the time of pasting down". Later, Kükenthal [in Engl. Pflanzenr. 4(20). *Heft* 101: 335. 1936] cited it as synonymous to *Cyperus lanceus* Thunb. (under subgen. *Pycreus*). Another aspect is also quite perplexing. Clarke (*l.c.*, 1893) described this species as having very long exerted style-branches making the spikelets comose and placed it under the genus *Juncellus* which has dorso-ventrally compressed nuts but later he himself (*l.c.*, 1898) and Kükenthal (*l.c.*) considered it synonymous to *Pycreus umbrosus* Nees (=*Cyperus lanceus* Thunb.) which has laterally compressed nuts and short style-branches scarcely exerted from the glumes. This confusion could have been the result of some wrong description of *J. stylosus* by Clarke who had studied only one collection, with immature nuts. Hence, only a re-examination of the above-mentioned *Griffith's* (?) collection alongwith confirmation of the locality is likely to clarify this issue.

Scirpus articulatus L. Sp. Pl. 47. 1753.

New to Assam; earlier known from other parts of India, S. E. Asia, Australia and Africa.

ASSAM: Lakhimpur: Kamlabari-Garmurhsatra, *Kataki* 41560.

Scleria pergracilis (Nees) Kunth, Enum. Pl. 2: 354. 1837. *Hypoporum pergracile* Nees in Edinb. New Phil. Journ. 17: 267. 1834.

New to Assam; earlier known from other parts of India, S. E. Asia and Africa.

NAGALAND: Kohima, *Bor* 22286.